UNITIVE ELECTRONICS INC. INVENTION DISCLOSURE

unitive ELECTRONICS INC.

Disclosure Number

Dislcosure Date

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Key Dates

Disclosed	Approved	Reviewed	Filed	Issued	Other

Title

A process for Chip Scale Packaging Including the Integration of Wire Bonding and Solder Deposition on the Same Chip.

Description

An under bump metallurgy (UBM) and process has been developed for Chip Scale Packaging. This process was developed to enable one to use one metallurgical stack as an underbump metallurgy for various Sn solders. This metallurgy/process can been used for the following applications:

1) A UBM for placing solder spheres of various Sn compositions as well as various Sn alloys, such as SnAgCu, PbSn, SnPb, and SnSb.
2) A wettable surface and UBM structure as a final surface for flip chip joining.
3) This structure will allow one to simultaneously have a part that can be flip-chip joined or ball loaded in one area of the die or substrate and wire bonded in an adjacent area of the same die or substrate.

Disposition

	Retain as Trade Secret			
	Hold for additional information, revisit on:			
	File application. Attorney assigned:			
	Combine with:			File as continuation in part
	Publish in:			Other

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The following is a process flow for a typical solder sphere/ball placement structure.

Step 1: Incoming wafers are treated by a wet chemical process (wet dip), sputtering process, and/or dry etch process to remove surface oxides and/or contamination on I/O pads that might increase contact resistance between the UBM and I/O pad.

Step 2: The under bump metallurgy is deposited on to the surface of the wafer using a sputtered and/or evaporated metal system. The under bump metallurgy is comprised of at least two layers: Layer one is an adhesion layer such as Ti and layer two is a conduction layer such as Cu.

Step 3: The wafer is coated with an organic material such as a spun on resist or dry film. This will act as a plating template.

Step 4: Expose the resist or dry film.

Step 5: Develop the resist or dry film.

Step 6: Plate 0.5 to 2.0 microns of Ni to form the barrier metallurgy

Step 7: Plate 0.05 to 2 microns Au to passivate the Ni.

Step 8: The under bump metallurgy in the field areas is removed by wet chemical etching. The Ni/Au pad acts as an etch mask preventing significant etching of the UBM under the Ni/Au pad. The copper is removed in a NH4OH/H2O2 etchant and the Ti is removed using a buffered fluoride etch.

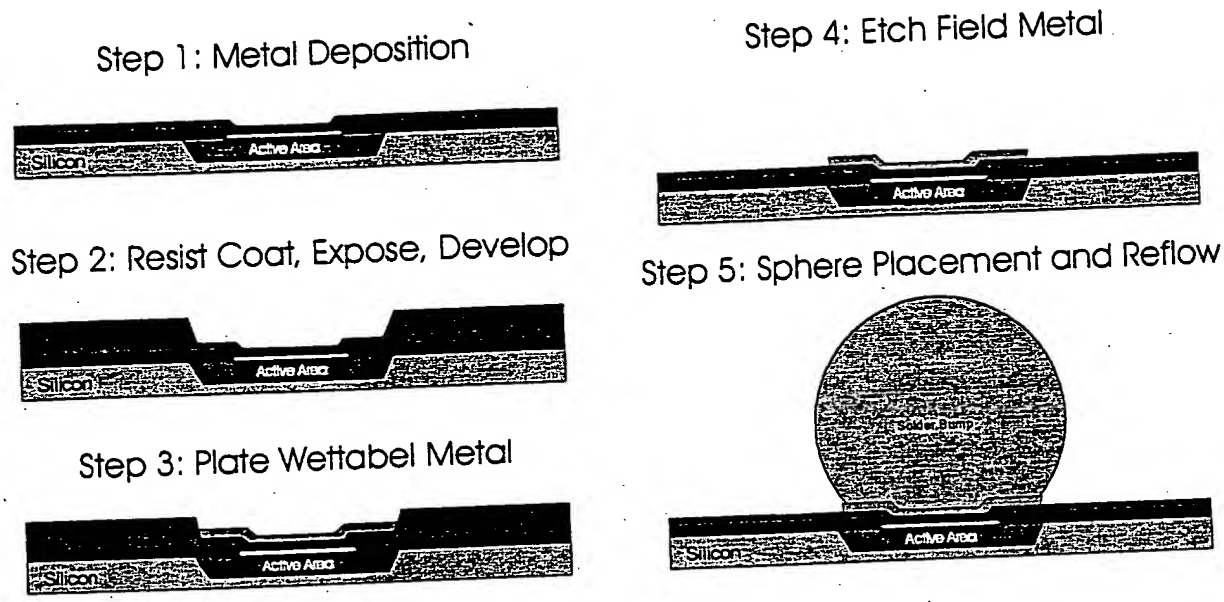
Step 9: Flux Au surface

Step 10: Place solder spheres on to the wettable surface.

Step 11: Heat/reflow solder allowing the Au to react and Sn to diffuse into the Ni

Step 12: Clean surface if necessary (this depends on the flux used).

*** Steps 1-8 can be used for direct chip attach or I/O that require wire bonding**



Sphere/Ball Loading Process Flow

Advantages

1. One under bump metallurgy can be used to allow for wire bonding and flip-chip joining on the same part.
2. One under bump metallurgy can be use for multiple Sn based solder compositions.